

October 30th, 1941.

W. H. S. McFarland, Esq.,
General Manager,
The Yukon Consolidated Gold Corporation, Ltd.,
D A W S O N, Y. T.

Dear Mr. McFarland:

I submit herewith a report on the Henderson Creek Examination covering the prospecting work done there in 1941, and estimates of probable yardages, gold content and working costs. Enclosed in separate form are maps showing the drilling results and a general map showing the entire area concerned in this report.

Henderson Creek is a secondary drainage system that empties into a slough or branch of the Yukon River about $2\frac{1}{2}$ miles below Stewart City, a small insular settlement, situated a short distance below the junction of the Stewart and Yukon Rivers. The directional tendency of the valley is North East or South West with two main branches which split nearly at right angles but later converge to head together opposite the heads of Montana and Black Hills Creeks.

The lower part of the valley is regular in that it widens progressively downstream but the two forks are definitely abnormal as the widths in the lower extremities are disproportionate to those up stream. Henderson Creek, like most streams of the Klondike district, is a dwarfed descendant of a former, broader, drainage system. In its process of rejuvenation it entrenched itself into the older valley some 50 to 75 feet leaving remnants or benches on either limit. The section of the Right Fork below Moosehorn Creek even abandoned its old course and constructed a new valley, leaving the former almost intact as a left limit bench. In its upper reaches the original valley was more confined and during the period of regrading was eroded its full width.

Gold was found on the upper part of the Right Fork and on its tributary, 60 Pup, in the very early days but as it was not in Bonanza quantities, the creek was temporarily abandoned by the miners. However, from 1900 to 1907, there was considerable mining activity, not always profitable, but enough to show a substantial production. Small operations were carried on as late as 1923.

The Left Fork although thoroughly prospected failed to show workable values except on some small benches at the mouth of Emaline Creek, a left limit tributary.

The ground held by the Company lies on Henderson proper, the Right Fork and on 60 Pup. It was first staked as 3 prospecting leases which were later converted into regular claims. There are in all 143 contiguous claims, having a total length of $13\frac{1}{2}$ miles and numbered from 1 to 96 above the mouth and from Discovery to 46 Above, both inclusive. No ground was staked on the Left Fork as it bore too little promise, and, if wanted, could be staked at a later time.

Some random drilling was done there by the Company in 1934, more to fulfill Government requirements for conversion of the prospecting leases to claims than an examination of dredgeable ground potentialities. It did indicate, however, that the lower end of the Creek from the forks down stream, was low grade and held little promise of workable values.

An advance party of six men and one team left Dawson on July 3rd to establish camp and make the necessary road repairs. The balance of the crew, drills, teams, equipment and supplies left Dawson on the 6th. By happy coincidence the river was at a high stage and the boat had little difficulty in entering the slough and landing at the road junction on the following day.

The drilling was first started at the forks and extended down stream on lines spaced 500 feet apart. It soon became evident that there was little possibility of developing ground of dredgeable tenor there and the drills were moved to the Right Fork. After advancing up stream about 2 miles with little progressive improvement in values it was decided to skip about 3 miles to a part of the Creek that offered greater possibility of favorable results. The drilling was resumed on Claim No. 85 and extended in both directions; down stream to Claim No. 73 Above the Mouth and up stream to Claim No. 44 Above Discovery. Above 44 Above Discovery the valley is constricted to canyon proportions, too narrow for dredging.

Camp was moved twice; first from the forks, where it was first established, to Claim No. 86 Above the mouth; second to Claim No. 23 Above Discovery. On each occasion one drill shift was lost as the drill teams were used for freighting and the men to break and erect camp.

The prospecting on Henderson Creek was concluded on August 3rd. Five days were required to transport the drills and equipment to the Yukon River where they were loaded on a barge. On the morning of August 11th a steamer took the barge and men to Dawson.

The drilling rate of 39.0 feet per shift as shown on the following summary was very good for shallow ground. It represented two holes and two moves per shift as the average depth of the ground was slightly over 19 feet. The muck and gravel were free drilling but the bedrock in the most

October 30th, 1941.

part, was slow as it was hard and blocky. The creek water channel was meandering and necessitated the construction of numerous bridges. Suitable timber was generally found nearby and little delay resulted. Ground conditions were favorable for moving the drills except at the Upper end of the Creek, where it had been mined by open cuts. Very little mechanical trouble was experienced. The Time and Footage Summary is as follows:

Time Summary-Hours						Footage			
Number of Holes	Drilling	Moving	Lost	Total	Shifts	Total	Per Drill Hour	Per Shift	
388	1022	485	230	1737	193	7540	7.4	39.0	

The character of the deposit is, in general, as follows:

(1) A layer of moss, muck and ice averaging about 9 feet in depth. The muck contains considerable sand and slide rock in parts of the creek but generally should sluice readily.

(2) A thin stratum of fairly coarse, well worn wash gravel, generally not more than 2 or 3 feet thick.

(3) A layer of residual gravel and broken bedrock with some intermixed wash gravel, averaging 5 to 8 feet in depth.

(4) Bedrock, hard and blocky throughout the Creek.

The gold found is uniformly fine, and occurs in flat flakes mostly, with some wiry particles. It generally lies on the top of and in the layer of residual gravel. There is no regular paystreak or persistent run of good values, the creek being spotty throughout.

The ground is frozen except for a very narrow strip paralleling the creek. Very few isolated thawed spots were found even in the old works.

The dredging reserve or workable values are confined to roughly 6 miles at the upper end of the Creek, from Claim No.42 Above Discovery to Claim No.75 Above the mouth. The area has been divided into 4 sections due to distinctive features and for yardage and value calculation.

Section 1. Covers an area in which no previous mining had been done. The values are fairly consistent but diminish rapidly toward the lower end. Both the valley and hillsides are covered with heavy timber.

Section 2. Covers an area in which no actual mining had been done but has evidence of considerable prospecting. The timber is scrubby and scattered. The flat has mess and niggerhead covering.

Section 3. Covers a portion of the creek where some drift mining had been done along a narrow and intermittent paystreak. Great variation in values indicate spotty ground.

Section 4. Covers an area which has been extensively worked by open cuts. It is narrow and has a very steep grade.

YARDAGE AND VALUE SUMMARY

Section No.	Between Lines	Area Sq.Ft.	Muck		D. S.		Gross at \$20.67			Gross at \$38.50		
			Depth	Cu.Yds	Depth	Cu.Yds.	¢Sq.Ft.	¢Cu.Yd.	Dol.	¢Sq.Ft.	¢Cu.Yd.	Dol.
1	75-92	2,519,700	7.5	696,200	8.3	772,807	8.5	27.6	213,516	15.8	51.5	397,695
2	92-A5	2,052,900	8.9	676,816	8.9	679,959	9.0	26.6	180,629	16.8	49.5	336,439
3	A5-A30	4,052,080	9.7	1,453,442	9.0	1,350,873	15.2	45.5	614,881	28.3	84.8	1,145,277
4	A30-A42	1,501,100	10.8	518,743	9.6	463,571	9.3	26.1	120,756	17.3	48.5	224,920
Totals-Average			9.1	3,345,201	8.9	3,267,210	11.4	34.6	1,129,782	21.2	64.4	2,104,331

There is little possibility of enlargement of reserves by extension of the area either up stream or down stream, for above, the valley becomes very narrow and no appreciable yardage would be gained over a considerable length and below, it enters that portion of the creek which in reconstruction migrated entirely from its old course and the only values there are those that were swept down from above.

Henderson Creek has four very valuable natural assets. They are:

1. An adequate water supply for the operation. In a summer of below normal rainfall, stream readings gave a minimum of 100 M.I.'s while the maximum was estimated at over 2,000 M.I.'s.
2. A fairly steep but not excessive creek grade. The grades for sections 1, 2, 3 and 4 are 1.4%, 1.7%, 1.8% and 3.0% respectively.
3. A supply of timber more than sufficient for the ordinary needs for native lumber and firewood of the operation.

4. Accessibility to river transportation.

There is one other very tangible asset - the wagon road. It extends the full length of the creek and is in fair condition throughout. It is, of course, wagon gauge and would have to be widened for use by trucks.

Henderson Creek is geographically isolated and would have to be operated entirely independent of the Klondike-Indian River operations. The only means of inter-communication is by river.

Summarizing the yardages and values on an operational basis we have:

Total Cubic Yards of Muck	3,345,000
Estimated Cu. Yds of Muck to be Stripped	2,200,000
Estimated Cu. Yds of Muck to be Dredged	1,145,000
Cubic Yards of Dredging Section	3,267,000
Estimated Total Cu.Yds to be Dredged	4,412,000
Total Gross Value Au. at \$38.50	2,104,000
Value in cents per cu. yd. dredged	47.8

The Estimated Capital and Operating Costs are:

Estimated Capital Expenditures:

Rehabilitation of Road	\$ 10,000.00
Construction of Ferry and Slips	5,000.00
Automotive Equipment	15,000.00
Warehouses	10,000.00
Camp Construction	30,000.00
Small Machine Shop	10,000.00
Dredge	150,000.00
Stripping and Thawing Equipment	50,000.00
Unforeseen	40,000.00
Total	\$320,000.00

Estimated Operating Costs:

Stripping 2,200,000 Cu.Yds. at 8.0¢	176,000.00
Thawing 4,400,000 " " 6.0¢	264,000.00
Dredging 4,400,000 " " 17.5¢	770,000.00
Total	\$1,210,000.00

Total Expense	1,530,000.00
Total Gross Value	2,104,000.00
Estimated Profit	574,000.00
Estimated Number of Dredge Years	15
Estimated Annual Profit	38,200.00

30th October, 1941.

The widening of the existing wagon road to accommodate truck traffic could be done cheaply and effectively with a bulldozer as it is built in the most part on the hillside. A few low wet stretches, generally short, would have to be filled by truck haul. Three bridges, with spans of 25 to 30 feet, and 12 culverts would have to be reconstructed. A fill 500 feet long with an average height of 4 feet would be required at the head of Steamboat Slough. A bridge is impractical owing to the extreme width of the channel. The fill would be above water even in flood stages.

Henderson Creek empties into a slough or tributary of the Yukon River and the road naturally ends there too. In only high stages of water, can steamboats enter the slough and discharge freight at the road terminus and then only under difficulties as there is no dock or unloading facilities. To bridge the slough would be costly and impractical as heavy ice flows pass through during the spring breakup. A small, current propelled ferry similar to the one at the North Fork and having a carrying capacity of about 30 Tons would suffice.

The automotive equipment would consist of:

- (1) One RD7 Diesel Cat, equipped with bulldozer and trailer.
- (2) One 2-Ton stake-bodied truck.
- (3) One $\frac{1}{2}$ Ton general utility pickup.

Two warehouses would be required; one at Stewart City for temporary storage and one at the main camp. They would be the regular scantling frame and corrugated iron sheathing type with no warm storage. That in the messhouse will be adequate for all requirements. The estimate also includes a small stiff-leg derrick to be built at Stewart Landing as there are no means for unloading heavy pieces at the present time. The camp would be somewhat similar to that now being built at Jensen and would consist of:

1. A 40-men Messhouse
2. Two 20-men Bunkhouses
3. A Cook's and Waiters' Bunkhouse
4. A small office building with bunking space for 4 men.

It is contemplated that at least one camp move is required and the buildings should be constructed with that in mind.

The machine shop as provided for would be wooden frame and corrugated iron sheathed. It would include a small repair shop for cats and

30th October, 1941.

trucks besides the regular shop equipment, such as a small lathe, drill press, gas and electric welding outfits and blacksmith shop.

The bedrock on Henderson is uniformly hard and blocky and to dig it will require a ruggedly constructed dredge. The maximum digging depth required is 13 feet below water surface with the average about 9 feet. The following are general specifications for the boat.

1. Pontoon type hull construction.
2. 3 Cubic Foot bucket capacity.
3. Capable of digging 15 feet below water surface.
4. Diesel or Diesel-electric powered.

The total required horsepower would be about 200 and if Diesel, could be divided into units similar to those of the stripping and thawing pumps for the advantage of standardization of spare parts.

The type of stripping and thawing equipment would be similar to that now in use at plants here but naturally of reduced size and quantity. The pumps, however, would be direct connected diesel powered units. That for the stripping should deliver approximately 2,000 U.S. G.P.M. at 150 foot head using 100 horsepower. The thawing pump should be a 100 horsepower unit delivering approximately 3,000 U.S. G.P.M. at 100 foot head. The main line pipe would be 15" in diameter on both plants so as to make it available for either one. The muck and gravel are shallow and the area covered by each plant will be large in proportion to the yardage gained and therefore, the pipe requirements will be somewhat in excess of the ordinary plant of the same capacity.

The scale of stripping and thawing would be much smaller than that here and the operations could be interlocked to a certain extent for labor saving purposes. One foreman would be in charge of both and the men shifted wherever needed.

The stripping season would be approximately 140 days and the total water used about 20,000 M.I.D.'s. A duty of 12 can be assumed for the entire area; at the upper end it will be less owing to the overlying tailings that will have to be handled but the lower part of the creek should strip easily. The annual yardage would be about 240,000 with a total stripping period of 10 years.

The crew consisting of 3 nozzlemen and 4 laborers would begin work about April 20th and continue to October 15th for a total of 180 days. The estimate of cost in detail is as follows:

30th October, 1941.

Labor	3.3	cents per Cu.Yd. muck removed.
Mess	1.3	do
Supplies	.1	do
Machine Shop	.1	do
Transportation	.2	do
Power	2.8	do
Supervision	.1	do
Engineering	<u>.1</u>	do
Total	8.0	

The gravel and bedrock on Henderson Creek contain only small amounts of clay and little fine sand. In general both resemble that of Quartz Creek and should thaw as readily. The thawing season should be approximately 134 days beginning May 10th and ending about September 20th. The total amount of water delivered would be about 35,000 M.I.D's which with a duty of 10 should thaw ample ground for the dredge. The cubic yards thawed annually would be 350,000 and it would take approximately 13 years to complete the thawing.

The crew would number 8 men and would consist of: Foreman, Night Shift Boss, 3 Pointmen and 3 Laborers. The work would start about April 20th and last until October 15th with the crew materially reduced before that time. A detailed estimate of the thawing cost is:

Labor	2.4	cents per Cu.Yd. thawed.
Mess	.9	do
Supplies	.2	do
Machine Shop	.1	do
Transportation	.1	do
Power	2.1	do
Supervision	.1	do
Engineering	<u>.1</u>	do
Total	6.0	

The gravel on Henderson Creek contains less sand or fine material than is usual for the creeks of this district and when thawed should be very easily dredged. The bedrock, however, is different for it is hard and blocky and will be slow digging. A 3 cubic foot dredge should, nevertheless, dig a daily average of 1500 cubic yards and figuring a working season of 200 days would dig 300,000 cubic yards annually. The operation, therefore, would have a 15 year life.

The probable dredge crew would be: Dredgemaster, 3 Winchmen, 3 Oilers, 3 Deckhands and 2 Shoremen, a total of 12 men.

Following is an estimate of the cost per cubic yard dredged, exclusive of the cost of stripping and thawing:

Direct Operating:

Labor	5.5 cents
Mess	2.3 "
Repair Parts	0.8 "
Other Supplies	0.3 "
Machine Shop	0.2 "
Transportation	0.2 "
Power	3.0 "
Total Direct	<u>12.3</u>

Non-Operating:

Shutdown	2.7 cents
Drilling	0.7 "
Bullion	1.6 "
Engineering	0.1 "
Supervision	0.1 "
Total now Operating	<u>5.2</u> "
Total Dredging Cost	17.5 "

The total number of men required are:

Stripping	7
Thawing	8
Dredge	12
Machine Shop	1
Transportation	2
Mess & Camp	3
Total	<u>33</u>

This number may vary during the season to some extent owing to certain contingencies, but should represent a normal force.

The general plan of operation would be to start at the uppermost end and work downstream. The reasons for this are:

1. To eliminate stripping water drainage problems. The dredging limits encroach upon the hillsides in many places, affording no room for bypass drains.
2. To make use of all available water in the most desirable sequence, i.e., by the dredge, the thawing and lastly by the stripping.
3. To permit the dredge to carry a maximum depth of water. Owing to the porosity of tailings resulting from the quality of gravel and bedrock it is doubtful whether a workable water level could be maintained if dredged up stream.

30th October, 1941.

4. To dredge the highest value ground first.
5. To set any possible extension of the life of the operation at the lower end where the probabilities for such an extension are the greatest.

In preparing the foregoing working cost estimates due consideration was given probable future advances in wages and prices. The freight rate differential between, Stewart City and Dawson is very small and would have no appreciable effect on costs.

Yours truly,

THE YUKON CONSOLIDATED GOLD CORPORATION, LIMITED.

By

A. M. Nordale

A.M. Nordale,
Ground Preparation Superintendent.

AMN:D



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